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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/841,444	04/24/2001	Scott Lee Wellington	5659-02300/EBM	4543

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EXAMINER	
SUCHFIELD, GEORGE A	

ART UNIT	PAPER NUMBER
3672	17

DATE MAILED: 12/16/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/841,444	Applicant(s) WELLINGTON ET AL.	
	Examiner George Suchfield	Art Unit 3672	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 October 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2117-2192,5396 and 5397* is/are pending in the application.

4a) Of the above claim(s) *2120-2122 and 2158-2160* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2117-2119,2123-2157,5396 and 5397* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *2117-2192, 5396 and 5397* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☒ The proposed drawing correction filed on *27 February 2002* is: a)☒ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *9-16* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

1. This application contains claims directed to the following patentably distinct species of the claimed invention:

A. Heating a hydrocarbon formation using an electrical heater(s). Claims 2120 and 2158 exemplify this species.

B. Heating a hydrocarbon formation using a surface burner(s). Claims 2121 and 2159 exemplify this species.

C. Heating a hydrocarbon formation using a flameless distributed combustor(s). Claims 2122 and 2160 exemplify this species.

D. Heating a hydrocarbon formation using a natural distributed combustor(s). Claims 2123 and 2161 exemplify this species.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, claims 2117-2119, 2124-2157, 2162-2192, 5396 and 5397 are generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after

the election, applicant must indicate which are readable upon the elected species. MPEP§ 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

2. During a telephone conversation with Eric B. Meyertons on October 3, 2002 a provisional election was made without traverse to prosecute the invention of Species D, claims 2123 and 2161. Affirmation of this election must be made by applicant in replying to this Office action. Claims 2120-2122 and 2158-2160 stand withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

3. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground

provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

5. Claims 2117-2192, 5396 and 5397 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 2117, 5171-5190 and 2156-2192 of copending Application No. 09/841,445. Although the conflicting claims are not identical, they are not patentably distinct from each other because the hydrocarbon-containing formation treated by the method of claims 2117 and 2156 of this pending application is deemed broad enough to encompass or comprise the coal formation of claims 2117 and 2156 of the copending '445 application. Otherwise, the pending claims of this application appear to correspond to the claims of the copending application with the additional limitation in claims 5396 and 5397 to 20 heat sources per recovery well deemed an obvious matter of choice or design based on, e.g., the characteristics, properties and/or areal extent of particular hydrocarbon formation encountered in the field..

These are provisional obviousness-type double patenting rejections because the conflicting claims have not in fact been patented.

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 2117, 2119, 2124-2126, 2129-2144, 2146, 2148, 2150-2152 are rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Gregoli et al (6,016,867).

Overall, Gregoli et al is directed to the in situ conversion of heavy hydrocarbon(s) in a subterranean formation into refinery-friendly lighter oil or hydrocarbon components. Gregoli et al heats the formation using one or more heat sources comprising downhole combustion units (206), and the heating is clearly effected in a reducing environment, as called for in claim 2117 (col. 5, line 50 – col. 6, line 8).

More specifically, Gregoli et al indicates that previous hydrocarbon heating processes, such as in situ combustion, resulted in evolved hydrocarbon/oils exhibiting deleterious

properties. One such deleterious property includes the presence of olefins (col. 3, lines 29-39). Accordingly, the Gregoli et al process is tailored or designed to minimize or eliminate the presence of any olefin compounds or components in the produced fluids,

Accordingly, since Gregoli et al is directed to an in situ hydrocarbon or heavy oil heating and conversion process which desires to minimize or eliminates the presence or formation of olefins, and includes the injection of use of hydrogen in the process, it is deemed that the resulting well(s) production effluents will inherently or obviously comprise "about .1% by weight to about 15% by weight" of olefins, as called for in independent claim 1097, with the precise amount depending on, e.g., the particular hydrocarbon formation actually encountered in the field.

As per claim 2124, the process of Gregoli et al (col. 8, lines 24-58) controls the pressure of the injection fluids comprising steam by controlling the temperature of the injected steam.

As per claim 2119, the process of Gregoli et al (col. 8, lines 24-32) clearly maintains the temperature and pressure within a pyrolysis range.

As per claims 2125 and 2126, insofar as the heating process may be carried out in a number of phases, e.g., as a hybrid operating mode (col. 11, lines 20-28), it is deemed the Gregoli et al process inherently or obviously effects the heating within the recited rates.

Regarding claims 2129-2142, 2152, it is deemed that the myriad hydrocarbon product mixtures recited in these claims would necessarily or obviously occur in carrying out the in situ heavy oil conversion process of Gregoli et al since Gregoli et al is directed overall to the reduction of all deleterious components/contaminants, such as sulfur and "unstable oxygenated components" (col. 3, lines 55-59; col. 5, line 50 – col. 6, line 7; col. 16, line 27 – col. 17, line

15), and further observes that the hydrogenation, overall, effected by their process will "convert unsaturated hydrocarbons to saturated products (note col. 2, lines 55-59), the precise composition of the product fluids is seen as dictated by the particular hydrocarbon or heavy oil naturally occurring in the particular oil formation actually encountered in the field. Moreover, it would be an obvious matter of choice to operate the Gregoli et al process to minimize considered refinery contaminants, such as sulfur, nitrogen and/or oxygen in the product mixtures. Similarly, it would be obvious to reduce or minimize the amount of asphaltenes in the product mixtures for optimum downstream refining. Also, in the event that the particular heavy oil deposit encountered yields ammonia gas, it would be an obvious expedient to utilize in a commercial process such as fertilizer production.

As per claim 2143 and 2144, both the hydrogen partial pressure and overall pressure (note Table 2) are well in excess of the amounts recited.

As per claim 2146, a major objective or object of the Gregoli et al process is to effect the conversion of the formation heavy oil into hydrocarbons of lower molecular weight. Accordingly, the hydrocarbons produced by the Gregoli et al process, which includes increasing or altering formation pressure, will inherently or obviously be of carbon numbers not in excess of 25.

As per claim 2148, clearly hydrogen is injected during the Gregoli et al process; the hydrogenation/hydroconversion will inherently or obviously heat the oil formation by the exothermic heat evolved.

As per claims 2150 and 2151, the process steps therein read on the fracturing and/or preliminary heating steps of Gregoli et al (col. 10, lines 26-55); the precise range of in excess of

100 millidarcy would inherently or obviously occur in such conventional heating/fracturing steps.

9. Claims 2128 and 2145 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gregoli et al (6,016,867).

The thermal conductivity recited in claim 2128 is deemed an obvious matter of choice or design based on, e.g., the quality of the heavy oil present and/or the matrix characteristics of the particular oil formation encountered in the field.

As per claim 2145, Gregoli et al (col. 11, lines 50-64) provides for overall control of the in situ heavy oil conversion process including measurement taken at the production well(s). Since hydrogen injection and treatment of the formation oil is major feature or embodiment of their invention, it would have been an obvious matter of choice to one of ordinary skill in the art to measure the partial pressure of hydrogen at the production well, e.g., as a way of determining or ascertaining that sufficient hydrogenation/conversion of the heavy oil is indeed occurring.

10. Claim 2147 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gregoli et al (6,016,867) as applied to claim 2117 above, and further in view of Gregoli et al (6,016,868).

It would have been obvious to one of ordinary skill in the art to which the invention pertains to further treat the produced mixture or "raw production" effluent obtained in the process of Gregoli et al '867 by separating out the injected hydrogen and recirculating it to the injection well(s), as taught by Gregoli et al '868 (note Figure 3), in order to enhance the overall '867 process, e.g., by minimizing the amount of additional hydrogen to be generated.

11. Claim 2149 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gregoli et al (6,016,867) in view of Gregoli et al (6,016,868) as applied to claim 1128 above, and further in view of Hoekstra et al (4,353,418).

Hoekstra et al separates out hydrogen from production effluent and directs such hydrogen to further refine oil or liquid hydrocarbon effluent.

Accordingly, it would have been obvious to one of ordinary skill in the art to which the invention pertains to further utilize the hydrogen separated out from the "raw production" in the process of Gregoli et al '867, as modified by Gregoli et al '868 (figure 3), as taught by Hoekstra et al (note the figure), in order to further upgrade the produced hydrocarbon for downstream refining, especially if the produced crude or hydrocarbon is still determined to have deleterious components/contaminants.

12. Claims 2153 and 5396 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gregoli et al (6,016,867) as applied to claim 2117 above, and further in view of Van Meurs et al (4,886,118).

Van Meurs et al (col. 8, lines 15-24) discloses a process for heating a subterranean hydrocarbon deposit featuring the use of a well pattern(s) which provides 6-12 heat sources per production well.

Accordingly, it would have been obvious to one of ordinary skill in the art to which the invention pertains to similarly employ a well pattern(s) providing such ratio of heat sources per production well, as called for in claim 2153, in the process of Gregoli et al, as taught by Van Meurs et al, in order to enhance the overall heating and in situ heavy oil conversion efficiency.

Similarly, it would have been an obvious matter of choice or design to employ even more heat sources per production well, such as 20, as called for in claim 5396, to provide even greater heating effect and in situ heavy oil conversion efficiency.

13. Claims 2154 and 2155 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gregoli et al (6,016,867) as applied to claim 2117 above, and further in view of Salomonsson (2,914,309).

It would have been obvious to one of ordinary skill in the art to which the invention pertains to carry out the multiple well in situ heavy oil conversion/recovery embodiment of Gregoli et al by providing or laying out the wells in a triangle, and/or repeating triangle pattern, as disclosed by Salomonsson (note Figure 3 and col. 3, lines 5-34) in order to enhance the overall heating/pyrolysis effected by optimizing well location. Moreover, note that Gregoli et al indicates that any conventional well pattern may be utilized (col. 10, line 66 - col. 11, line 9).

14. Claims 2117-2119, 2123, 2125-2142, 2146, 2147, 2148, 2150-2152 2156, 2157, 2161, 2163-2180, 2184, 2185, 2187-2189 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Schlinger et al (3,617,471) and Slater (3,084,919).

Schlinger et al discloses a process for pyrolysis and hydroretorting of oil shale comprising, in one embodiment, a subterranean oil shale deposit or formation, which may be initially completed, heated and/or exploited by the process of Slater (as referred to in col. 2, lines 62-67 of Schlinger), while applying additional control steps, such as controlling the pressure , the pressure within the oil shale formation during the pyrolysis/hydroretorting operation between

300 – 1000 psig, preferably 400 – 600 psig, such that "maximum yields of shale oil of improved quality" and/or "hydroretorted shale oil ... of superior quality" is obtained (Schlinger et al col. 4, lines 9-29).

In carrying out the process of Schlinger et al and Slater to evolve and produce hydrocarbon products from a subterranean oil shale formation, the hydrogenation and hydroretorting effected via injection of the hydrogen fluid is deemed to inherently or obviously comprise a step(s) of heating the formation in a reducing environment, as called for in independent claims 2117 and 2156. The additional step(s) in claim 2156 of recirculating a portion of hydrogen recovered from production effluent from a first formation section (surrounding wellbore 6 in Slater) to a second formation section (surrounding wellbore 7 in Slater) to provide a reducing environment within the second formation section (7) is set forth in Slater.

As per claim 2118, it is deemed that during the initial heating phase and/or the hydroretorting phase of Schlinger et al, as practiced using the multi-well arrangement of Slater, as illustrated, it is deemed that at least some overlap or "superposition" of the heating from each wellbore will inherently or obviously occur.

As per claims 2123 and 2161, the process of Schlinger et al, as applied to the oil shale formation illustrated and completed in Slater, incorporated therein, may employ the in situ combustion step(s) of Slater, i.e., as comprising the embodiment wherein "the oil shale reaction zone may be externally heated" (col. 2, lines 62-67 of Schlinger et al). Moreover, Slater indicates that, at one point in the heating, formation shale oil is burned in the well and the

combustion products are produced to the surface, thus comprising a "natural distributed combustor", as recited.

As per claims 2119 and 2157, pyrolysis clearly occurs in the formation.

It is deemed that the precise heating rates set forth in claims 2125, 2163, 2126 and 2164, as well as the thermal conductivity recited in claim 2128 and 2166 will inherently or obviously occur during the process of Schlinger et al, as applied to the oil shale formation completed by Slater, based on or dictated by, e.g., the characteristics and properties of the oil shale formation actually encountered in the field.

As per claims 2127 and 2165, during the initial heating phase of Schlinger et al, i.e., deploying the wellbores of Slater, it is deemed that the heating will inherently or obviously occur by conduction because it is disclosed that the wellbore combustion products are produced back up the wellbore(s), apparently in lieu of providing convective heat transfer to the formation.

Regarding claims 2129-2142 and 2167-2180, it is deemed that the myriad hydrocarbon product mixtures recited in these claims would necessarily or obviously occur in carrying out the heating process of Schlinger et al, i.e., the precise composition of the product fluids is seen as dictated by the type of oil shale naturally occurring in the particular oil shale formation actually encountered in the field. Moreover, it would be an obvious matter of choice to operate the Schlinger et al process to minimize what would be considered refinery contaminants, such as sulfur, nitrogen and/or oxygen in the product mixtures. Similarly, it would be obvious to reduce or minimize the amount of asphaltenes in the product mixtures for optimum downstream refining. Moreover, as noted above, Schlinger et al makes repeated references to "superior quality" shale oil, "greater amount of the desirable middle distillate material", "high quality

product shale oil", and further observes that "the sulfur and nitrogen content of our shale oil ... 25 to 35 percent lower" (col. 4, lines 22-29). Also, in the event that the particular oil shale deposit encountered yields ammonia gas, it would be an obvious expedient to utilize it in a commercial process such as fertilizer production.

As per claims 2143 and 2181, the operating pressure range(s) in Schlinger et al of , e.g., 400-600 psig, is clearly in excess of 2.0 bar.

As per claims 2144 and 2182, Schlinger et al (col. 4, line 49-col. 5, line 6) discloses that hydrogen is also produced with the production effluent; the exemplary range of hydrogen of 45-85 % of a non-condensable gas effluent of the production mixture would inherently or obviously represent a partial pressure of hydrogen > .5 bar.

As per claims 2146 and 2184, the produced shale oil, as described above, especially wherein a large amount of C6 component is produced, will inherently or obviously contain a minimal amount of > C25 hydrocarbons, which would clearly not comprise a "superior quality" or "high quality" shale oil. Moreover, Schlinger explicitly desires to suppress the formation and production of constituents similar to C25 hydrocarbons comprising "heavy polymers, unsaturated hydrocarbons and carbonaceous residues" (col. 3, lines 35-42). Accordingly, the process of Schlinger et al, as practiced or applied in a subterranean oil shale formation heated or prepared by the process of Slater, incorporated therein, heats, hydroretorts and controls the pressure within the oil shale formation such that production of hydrocarbons having carbon numbers greater than C25 is inherently or obviously inhibited.

As per claim 2147, Schlinger et al also provides for recirculating the hydrogen back to the oil shale formation.

Insofar as the entire process of Schlinger et al is directed to hydrogenating, i.e., hydroretorting of the evolved hydrocarbon(s) from the oil shale, a resulting "heat from hydrogenation" will similarly occur within the oil shale formation, as called for in claim 2148 and 2185.

As per claims 2150, 2187, 2151 and 2188, Schlinger et al (col. 5, lines 7-16) further indicates that a fractured and resulting "porous structure of the shale" will occur during their heating process. It is further deemed that such permeability increase will inherently or obviously be substantially uniform, as called for in claims 2151 and 2188. Such permeability increase is deemed to necessarily or inherently encompass an increase to "greater than about 100 millidarcy", as called for in claims 2150 and 2187; alternatively, to increase the permeability to greater than 100 millidarcy would have been an obvious matter of choice in order to ensure adequate fluid flow through the formation.

As per claims 2152 and 2189, Schlinger et al (col. 1, lines 55-75) effects a shale oil yield of "greater than 110 percent of the Fischer Assay". Clearly, such yield is greater than 60% of the Fischer Assay, as recited.

15. Claims 2149 and 2186 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schlinger et al (3,617,471) and Slater (3,084,919), as applied to claims 2117 and 2156 above, and further in view of Hoekstra et al (4,353,418) or Garrett (3,661,423).

It would have been obvious to one of ordinary skill in the art to which the invention pertains to hydrogenate the hydrocarbons produced from the heating process of Schlinger et al, which hydrocarbons may be in liquid and/or vaporous form, with hydrogen unreacted and/or produced by the heating/hydroretorting process of Schlinger et al, as applied to the oil shale

formation of Slater, incorporated therein, as taught by Hoekstra et al (note the Abstract and figure) or Garrett (col. 4, lines 50-54), in order to improve the overall quality of the liquid and/or condensable hydrocarbon fluids produced by Schlinger et al and Slater.

16. Claims 2154, 2191, 2155 and 2192 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schlinger et al (3,617,471) and Slater (3,084,919), as applied to claim 2117 and 2156 above, and further in view of Salomonsson (2,914,309) or Camacho et al (4,067,390).

It would have been obvious to one of ordinary skill in the art to which the invention pertains to carry out the multiple well heating embodiment of Schlinger et al, as applied to the oil shale formation as heated and/or completed by Slater (note col. 3, lines 13-29), incorporated therein, by providing or laying out the wells in a triangle, and/or repeating triangle pattern, as disclosed by Salomonsson (note Figure 3 and col. 3, lines 5-34) or Camacho et al (note Figure 8) in order to enhance the overall heating/pyrolysis effected by optimizing well location.

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

18. It is noted that claims 2162, 2183 and 2190 are rejected above only under obviousness double patenting.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Suchfield whose telephone number is 703-308-2152. The examiner can normally be reached on M-F (6:30 - 3:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Bagnell can be reached on 703-308-2151. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-7687 for regular communications and 703-305-7687 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1113.

George Suchfield
George Suchfield
Primary Examiner
Art Unit 3672

gs
December 13, 2002